

Work Order ID 74924

74924

U/A

Page 1

October 13, 2011 1:02:21 PM

Item ID: D350-748-101

Accept

N9000040100

Setup Start *NS1*

Revision ID: U/R

Item Name: Crosstube Installation, High Fwd

Stop *NS2*

Start Date: 10/13/11 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/11/11 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start *NR1*
Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D350-748-141	F U R OK 11.10.17

100 DOCUMENT CONTROL

100

DC

Document Control

Memo

Photocopy bluefile & type labels per PPPD350-748-101 CHG002

110

110

CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

120

120

QC

Quality Control

QC15- Crosstube Dimensional Check

Memo

SCRAP

11-11-10

Sub 1/10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11.12.13	160	Tube has crack near drill hole.		Scrap tube 9/11/13 N/A				

NOTE: Date & initial all entries

Work Order ID 74924

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Item ID: D350-748-101 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: U/R Stop ***NS2***
 Item Name: Crosstube Installation, High Fwd
 Start Date: 10/13/11 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 11/11/11 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
125		0.00							
125									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	***Stress relief*** Heat treat crosstube as per QSI010 4.3 Temp: <u>325</u> Start time: <u>6h20</u> Finish time: <u>10h20</u>								
127	QC6- Inspect dimensions to drawing	0.00							
127									
QC	Memo	0.00							
Quality Control									

② SAD 11-11-11

8 ululu

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Revision ID: U/R

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Item Name: Crosstube Installation, High Fwd

Start Date: 10/13/11 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/11/11 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130

0.00

130

Crosstubes

Crosstubes

Memo

0.00

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B & C Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube
Batch: **M109956**

140

QC5- Inspect part completeness to step on W/O

0.00

140

QC

Memo

0.00

Quality Control

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
150									
Outsource3	Memo	0.00							
Outsource process - Cad plate	Issue P/O: <u>15462</u> Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								<u>11-11-15</u> Q
160	Receive & Inspect for Damage & Mat'l Certs	0.00							
160									
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								
170	QC5- Inspect part completeness to step on W/O	0.00							
170									
QC	Memo	0.00							
Quality Control									

★ SEE W/O CHG ATTACHED

issue P/O: 15634 NDT accen

CLL11/12/08 ①

rec'd

11/12/15 ①

W/O:		74924 WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D35D-748-101 PAR #: _____ Fault Category: X-tube NCR: Yes No DQA: 1/2 Date: DEC 14 2011
 Resolution: SCRAP Disposition: SCRAP QA: N/C Closed: OK Date: 11/12/15

NCR: 11-1074		2357.84 WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11/12/13	10	tube has crack in to 10" hole. tube has failures Q.NDT inspection. R.C. Process	<u>OK</u> 11/12/13 Q51042	SCRAP + Destroy no Repair. CP 11.12.13	<u>M.M.</u> 11/12/13	<u>S</u> 11/12/13	<u>OK</u> 11/12/13 Q51042	<u>S</u> 11/12/13

NOTE: Date & initial all entries

Dart Aerospace Ltd

W/O: 74924 WORK ORDER CHANGES								
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11.10.05	161	LOAD TUBE TO 3500 ^{lb} FOR 1 MINUTE. REF D.S. EMBIL.				CP 11.10.12 QS1642		
11.10.05	162	NDT TUBE.				CP 11.10.12 QS1642		

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 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

Work Order ID 74924

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 Required Date: 11/11/11 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180		0.00							
180	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190	QC14- Inspect Spray Paint	0.00							
190									
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200		0.00							
200	Crosstubes								
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	QC5- Inspect part completeness to step on W/O	0.00							
210									
QC	Memo	0.00							
Quality Control									
220	Pick Kit	0.00							
220									
Packaging	Memo	0.00							
Packaging									
230	QC4- 100% Inspect kits for completeness	0.00							
230									
QC	Memo	0.00							
Quality Control									

R 11-12-14
Ⓟ

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 10/13/11 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 11/11/11 **Req'd Qty:** 1.00 *** 1 ***

Customer:

Reference:

Run Start *NR1*

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

240	0.00
-----	------

240

Packaging

0.00

0.00

Packaging

Memo

Packaging

Identify and pack for shipping as per PPP D350-748-101

Location:

PPP Rev: _____

250

QC21- Final Inspection - Work Order Release

0.00

250

Memo

0.00

QC

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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October 13, 2011 1:02:26 PM

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

74924

D350-748-101

Start Date: 10/13/11**Required Date:** 11/11/11

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:A New Issue 06-07-05 JLM

IPP Rev:B Update qty of MS21042L5 06-09-12 KJ

IPP Rev:C Rev B 07-11-15 DD

IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F

10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-141TRN		Manufactured	No			110	Each	0.0000	1	1			
D350-748-141TRN													
Crosstube Turning Detail													
ALS4-1032-225		Purchased	No			200	Each	2,660.000	1	1			
AI S4-1032-225													
Insert													
				<u>Location</u>			<u>Loc Qty</u>			<u>Loc Code</u>			
				ST282			2660						
				108696			808						
				110768			62						
				118386			860						
				118966			930						
AN960JD10	NAS1149D0363J	Purchased	No			200	Each	0.0000	1	1			
AN960JD10													
Washer													

W/O:		WORK ORDER CHANGES					
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Picklist Print

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Work Order ID: 74924

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Parent Item: D350-748-101

D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 10/13/11

Required Date: 11/11/11

Start Qty: 1.00

Required Qty: 1.00

D2856-400

Manufactured No

200 f

334.8845

1.181

1.243158

D2856-400

Abraison Strip

******LocationLoc QtyLoc Code

ST403

0.3149

68076

0.3149

ST409

334.5696

63735

0.6696

71164

117.9

73491

216

D3502-1

Manufactured No

200 Each

59.0000

2

2

D3502-1

Support

******LocationLoc QtyLoc Code

ST063

59

61206

3

64004

10

68951

12

72129

14

73419

20

MS21920-20

Purchased No

200 Each

56.0000

2

2

MS21920-20

Clamp (per MIL-DTL-8783C)

******LocationLoc QtyLoc Code

LG050

56

116799

10

118649

46

W/O:		WORK ORDER CHANGES					
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Required Date: 11/11/11

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

165.0000

1

1

MS27039-1-10

**

Screw

Location

Loc Qty

Loc Code

ST291

165

118612

165

AN4-41A

Purchased

No

220

Each

293.0000

8

8

AN4-41A

**

Bolt

Location

Loc Qty

Loc Code

ST360

293

115108

18

115705

50

116191

50

117619

50

117795

25

118451

50

118838

50

AN4-6A

Purchased

No

220

Each

6,024.000

16

16

AN4-6A

**

Bolt

Location

Loc Qty

Loc Code

ST356

1018

118422

118

118628

400

118838

300

119127

200

ST358

6

117514

6

ST516

5000

119017

5000

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Start Date: 10/13/11

Required Date: 11/11/11

Start Qty: 1.00

Required Qty: 1.00

AN5-32A	Purchased	No	220	Each	171.0000	4	4
---------	-----------	----	-----	------	----------	---	---

AN5-32A

Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST339	75	
118628	50	
118983	25	
ST340	96	
117872	46	
118422	50	

AN960JD416	NAS1149D0463J	Purchased	No	220	Each	0.0000	32	32
------------	---------------	-----------	----	-----	------	--------	----	----

AN960JD416

Washer

AN960JD516	NAS1149D0563J	Purchased	No	220	Each	0.0000	8	8
------------	---------------	-----------	----	-----	------	--------	---	---

AN960JD516

Washer

D3500-1	Manufactured	No	220	Each	20.0000	4	4
---------	--------------	----	-----	------	---------	---	---

D3500-1

Saddle

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST424	20	
66127	8	
68947	12	

W/O:		WORK ORDER CHANGES					
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Parent Item Name: Crosstube Installation, High Fwd

Start Date: 10/13/11

Required Date: 11/11/11

Start Qty: 1.00

Required Qty: 1.00

D3501-1

Manufactured No

220

Each

213.0000

16

16

D3501-1******

Bushing

LocationLoc QtyLoc Code

ST063

202

68939

102

70682

100

ST066

11

67757

11

MS21042L4

Purchased

No

220

Each

14,231.00

24

24

MS21042L 4******

Nut

LocationLoc QtyLoc Code

ST300

3231

117441

51

117601

557

117885

56

118451

1567

118927

1000

ST516

6000

119017

6000

ST518

5000

119075

5000

W/O:		WORK ORDER CHANGES					
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Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

220

Each

2,574.000

4

4

MS21042L5

Nut

Location

Loc Qty

Loc Code

ST300

1074

116105

5

116548

53

117441

138

117611

82

118179

496

118910

300

ST518

1500

119109

1500

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

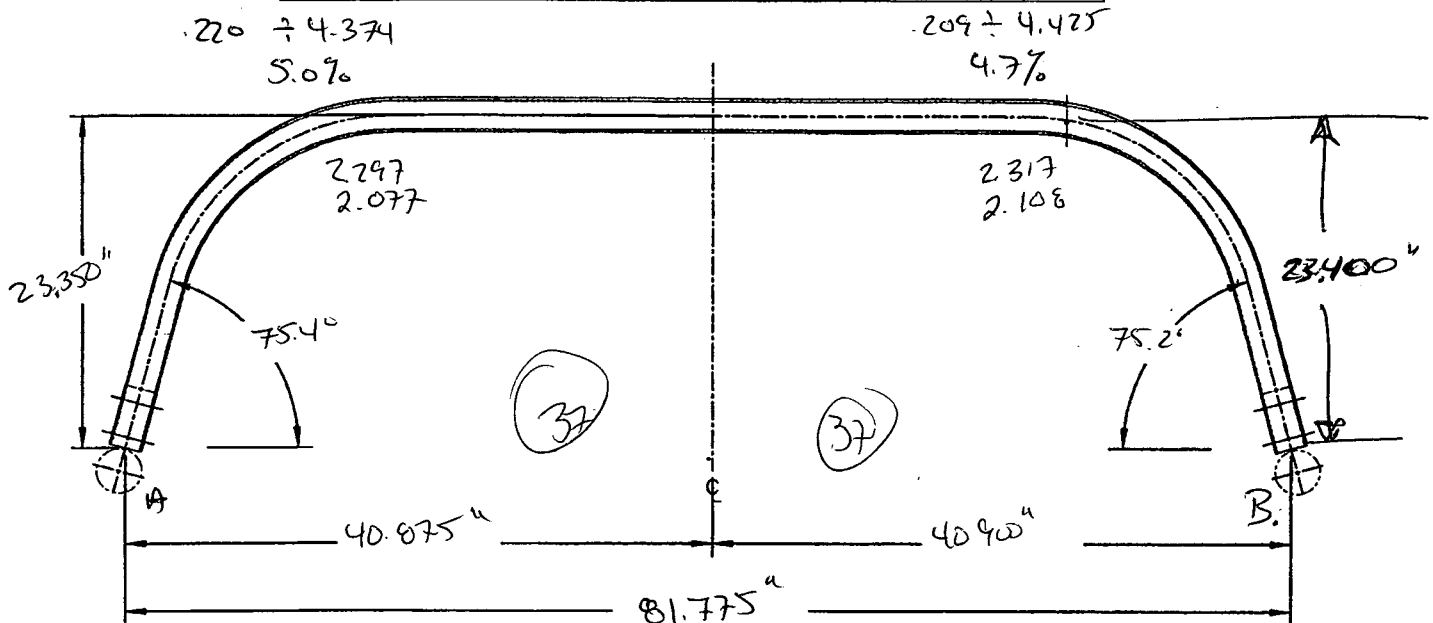
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	74924 74799
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141	Rev: E	Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist = 0.214
Side A = 5.0% crush @ 37 psi
Side B = 4.7% crush @ 37 psi
Bent high, Acceptable @ 11.11.08

QC15 Inspection	S
Date	11/11/11

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

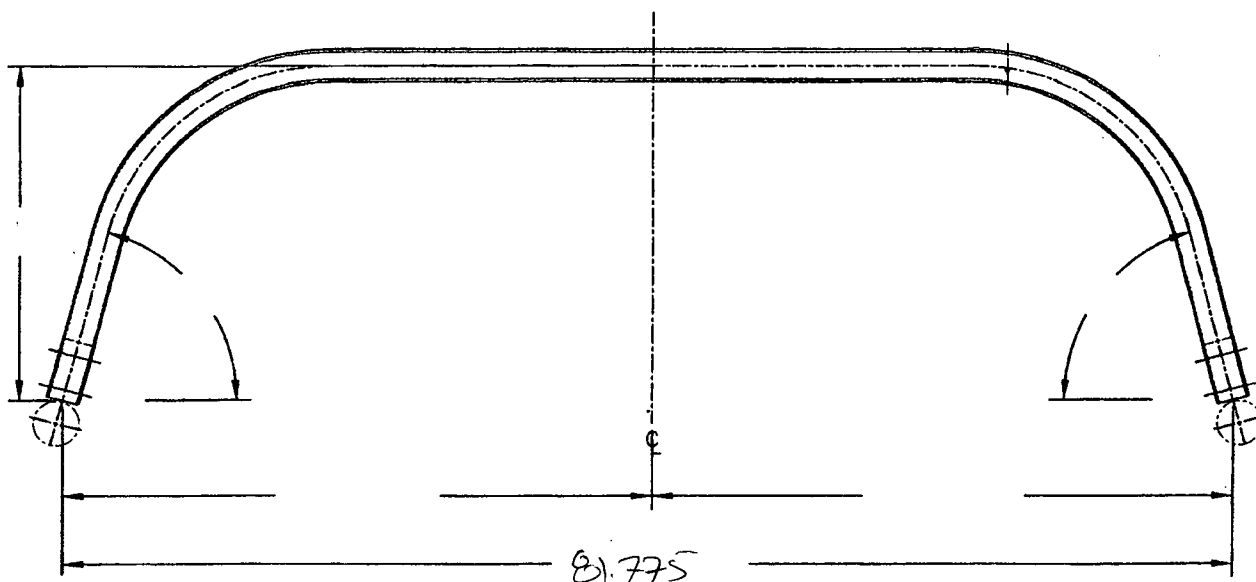
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	
Description: Crosstube High Fwd (AS350/355)	Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1

For stress Bell only

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist = 0.214

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

NO. ~~1000000000~~ M.L.J

74924 11/10/12

OK QP 11/10/12
UNDER REVIEW

RELEASED
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	QP	DART AEROSPACE LTD	
DRAWN	QP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	QP	DRAWING NO.	REV. F
MFG. APPR.	QP	D350-748-141	SHEET 1 OF 4
APPROVED	QP	TITLE	SCALE
DE APPR.	QP	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

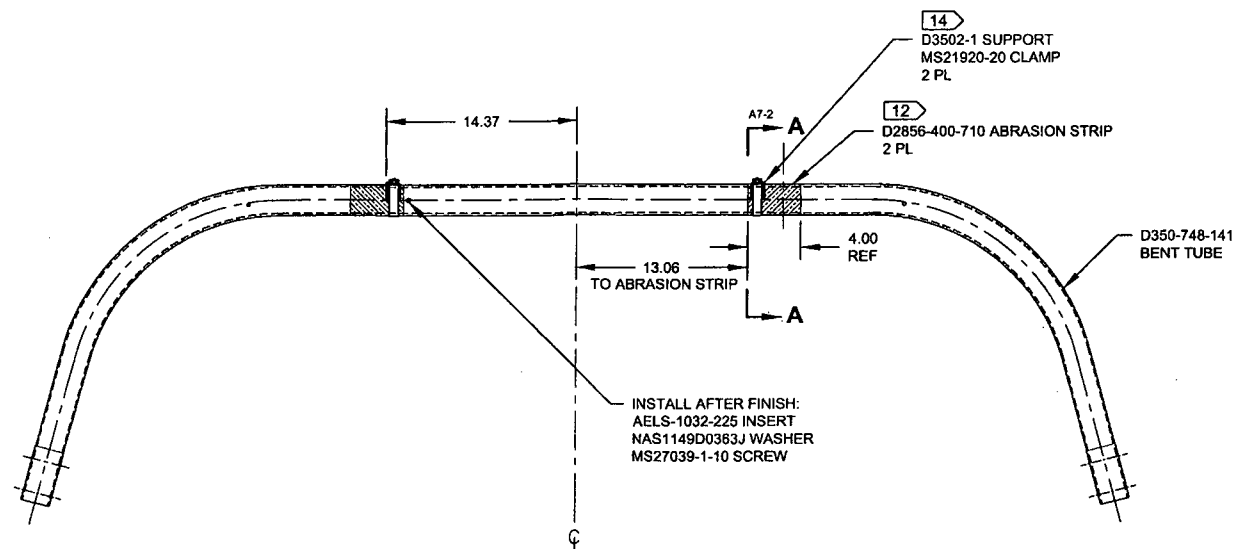
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

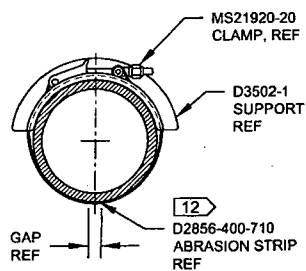
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74924



**D350-748-141
ASSEMBLY DETAIL**









SECTION A-A D4-2
SCALE 4X

UNDER REVIEW

CP 11.07.11

RELEASED
R 2011-01-08

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D350-748-141	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2005 BY DART AEROSPACE LTD	
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.			

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

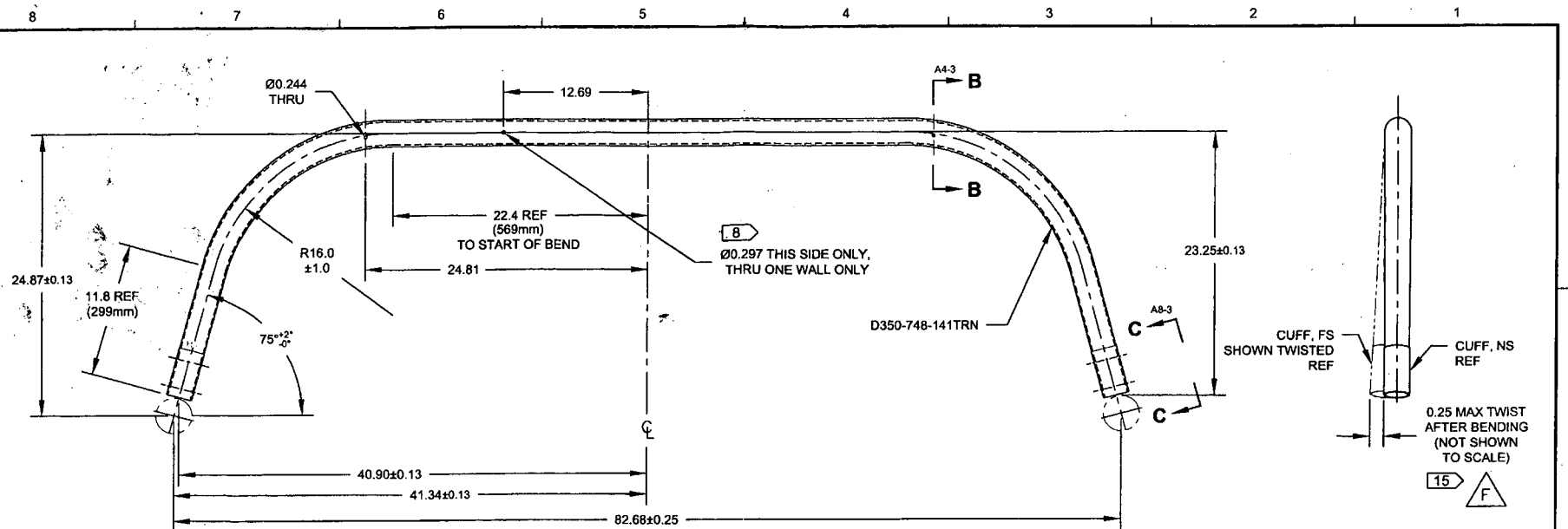
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

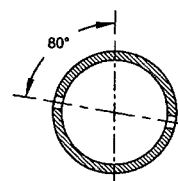
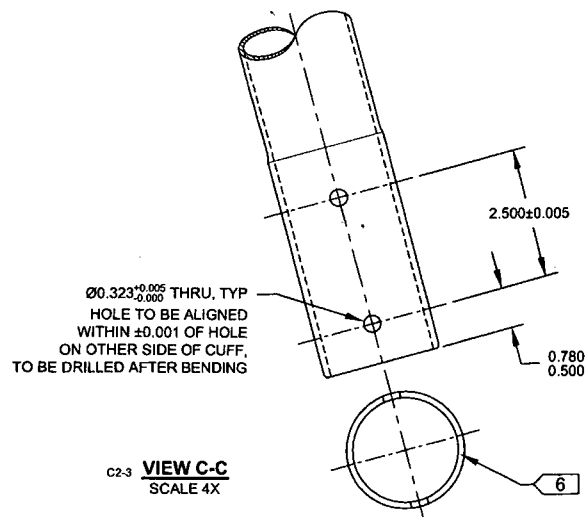
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74924



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

UNDER REVIEW

11-27-12

RELEASED
2011-01-18

DESIGN	DP	DART AEROSPACE LTD	
DRAWN	DP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	B	DRAWING NO.	REV. F
MFG. APPR.	B	D350-748-141	SHEET 3 OF 4
APPROVED	B	TITLE	SCALE
DE APPR.	B	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

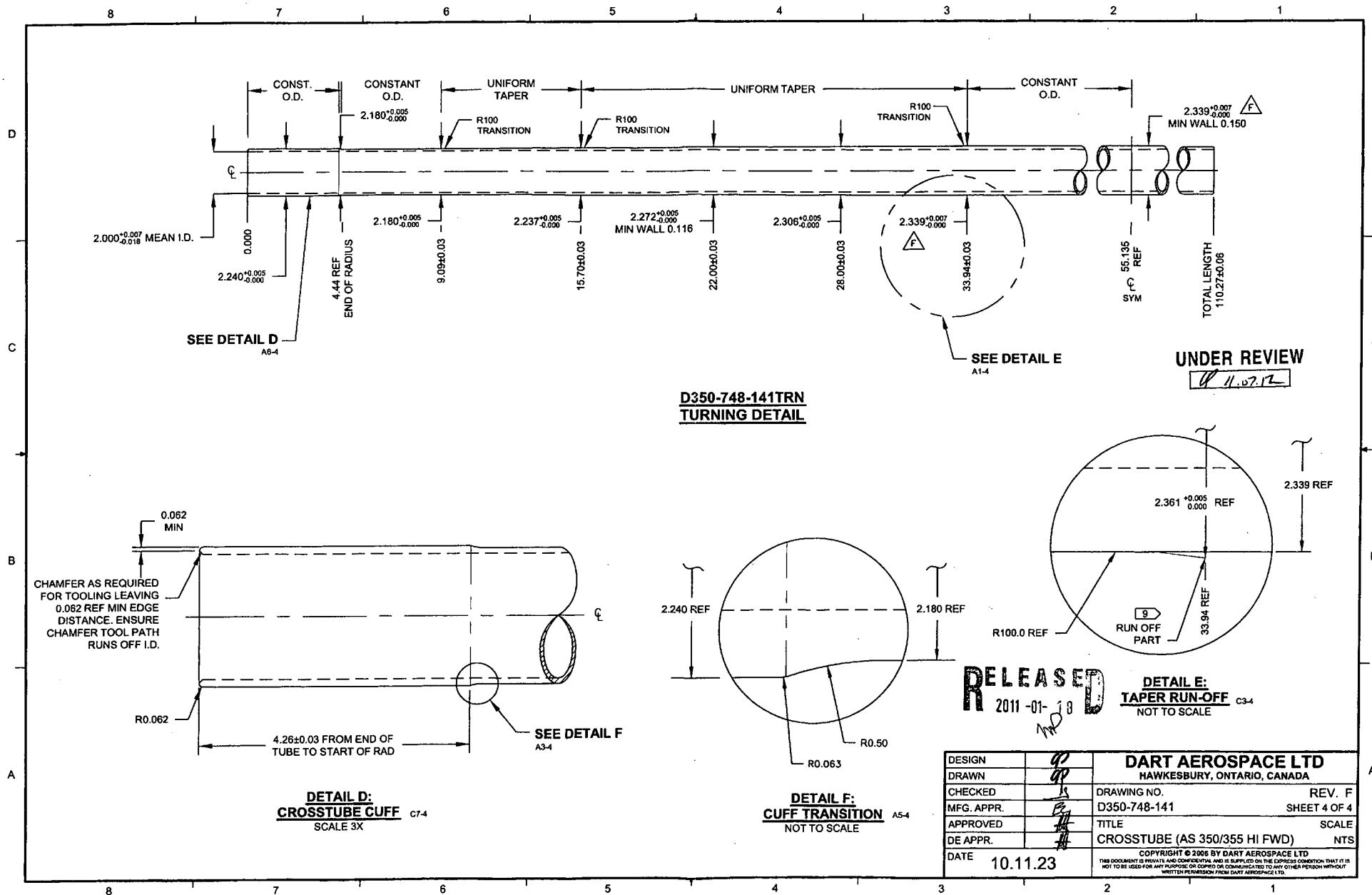
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74924

~~74924~~



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Nov-25-2011

CONIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 109692

INVOICE #: 57840

**CONTRACT OR
PURCHASE ORDER #** 15462

DESCRIPTION: SKID

QTY 1

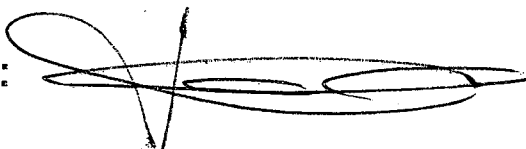
P/N # d350-748-101

S/N # B74924

STRESS RELIEVE BAKE HEAT CHART #11-1209. MPI IAW ASTM-E-1444. CADMIUM PLATE IAW AMS-QQ-P-416C TYPE 2 YELLOW CLASS 2. BAKE HEAT CHART # 11-1236.

CERTIFICATE: I certify that the items indicated here on have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:





LIQUID PENETRANT TEST REPORT

P- 12242

PAGE 1 OF 1

CLIENT DART Aerospace DATE Dec 7, 2011 TIME AM ☒ PM ☐
ATTENTION LINDA ACUREN JOB NO. 188-11-02400
ADDRESS 1770 ABERDEEN ST PO/VO NO. ---
HAWKES BAY, O.N. WORK LOCATION SAME
PROJECT F.P.I. O.N. CROSS TUBES & ENGINE MOUNTS ACCEPTANCE STD. ASTM 1417/1418-08 REV./DATE 2005
ITEM(S) EXAMINED A WET FLUORESCENT LIQUID PENETRANT INSPECTION WAS CARRIED OUT 100% EXTERNAL

JOB DESCRIPTION SEE RESULTS PROCEDURE NO. LT-012 REV./DATE 2008 TECHNIQUE NO. LT-1342 REV./DATE 2008
PART NO. --- MATERIAL ALUMINUM THICKNESS VARIOUS + STEEL
SCOPE 10 CROSS TUBES, 2 ENGINE MOUNTS

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	<u>MA GNAFLUX</u>		BLACK LIGHT S/N	<u>10459</u>	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
PENETRANT	<u>2-62</u>	MINIMUM DWELL TIME	<u>45</u>	MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT
PENETRANT REMOVER	<u>HFO</u>	MINIMUM DRY TIME	<u>>10</u>	MIN.	OTHER <u>LABING</u>
DEVELOPER	<u>SKD 5.2</u>	MINIMUM DWELL TIME	<u>10</u>	MIN.	LIGHT METER S/N <u>1098866</u>
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		CAL DUE DATE <u>FEB 12 2012</u>

TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F	<input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F	<input type="checkbox"/> > 52°C/ 125°F	

RESULTS- ☒ METRIC ☐ IMPERIAL

1	ENGINE MOUNT #73732	✓	
1	- CROSS TUBE W.O. 75831	✓	
2	- CROSS TUBE W.O. 75830	✓	
1	ENGINE MOUNT #73731	✓	
1	- CROSS TUBE W.O. 77109	✓	
1	- CROSS TUBE W.O. 77108	✓	
1	- CROSS TUBE W.O. 77428	✓	
1	- CROSS TUBE W.O. 77290	✓	
1	- CROSS TUBE W.O. 77291	✓	
1	- CROSS TUBE W.O. 77930	✓	
1	- CROSS TUBE W.O. 77924	✓	
1	- CROSS TUBE W.O. 77667	✓	

REFOUND
REFOUND
REFOUND
TARE IN DRILL HOLE.
NOTE of REFOUND

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	<u>Jan Titley</u>	SIGNATURE	DTR # <u>E96917</u>
TECHNICIAN (SIGNATURE)	<u>Mike Ithas</u>		REPORT REVIEWED BY:
NAME (PRINT):	<u>Mike Ithas</u>	1 ST TECHNICIAN	NAME
CGSB LEVEL	<u>II</u>	SNT LEVEL	INITIALS
CGSB REG. NO.	<u>6606</u>	CGSB LEVEL	
		SNT LEVEL	
		CGSB REG. NO.	


CADORATH AEROSPACE
LAFAYETTE

114 LAFFERTY DRIVE BROUSSARD
LOUISIANA, U.S.A. 70518
REPAIR STATION # 04YR302Y

CADORATH AEROSPACE INC.
CADORATH AUROSAPCE
DISTRIBUTION INC.

2070 LOGAN AVE., WPG, MB.,
CANADA R2R 0H9

Warning / Unserviceable / Reject Tag

CUST <i>DMT</i>	P/N <i>338748101</i>	S/N <i>B14930</i>	UNIT <i>/</i>
P/O <i>15462</i>	W/O <i>109688</i>	QTY. <i>1</i>	MODEL <i>/</i>
REMOVED FROM S/N			
TSN	CSN <i>Ma</i>	ADDITIONAL P/O'S	
DISCREPANCY <i>1 crack coming out of</i> <i>Attacher's Hole</i>			
REWORK INSTRUCTION			
NCR # <i>/</i>	DATE <i>Nov 23-11</i>	INSPECTOR SIGNATURE <i>Cole</i>	STAMP 

CADORATH GROUP
NON CONFORMANCE REPORT

CADORATH AEROSPACE ☐

CADORATH DISTRIBUTION ☐

CADORATH COATING ☒

UNIFLYTE ☐

NOTE: THIS FORM MUST BE COMPLETED BY: CUSTOMER ☒ VENDOR ☐ BEFORE PROCESSING OF PART(S)

NCR#: **C1110 (REVISED)**

CUSTOMER: ☒ **Dart Aerospace Ltd.**

DATE: **12/12/11**

VENDOR: ☐ **N/A**

CADORATH/UNIFLYTE P/O #:

N/A

PART DESCRIPTION: **Skid (Crosstube)**

CADORATH/UNIFLYTE W/O #:

109692 (REVISED)

CUSTOMER P/O #: **PO 15462**

PART #: **d350-748-101**

SERIAL #: **B74924 (REVISED)** QUANTITY: **ONE (1)**

PURCHASE ORDER INSTRUCTIONS: **Cadmium Plate**

DISCREPANCY: **This part failed our MPI test after plating. It was found cracked by the edge of the hole where the tag is attached. We have stopped processing this part and would like to send this part back for your evaluation.**

Nick Wasylik (QA Manager)

CADORATH/UNIFLYTE INSPECTION DEPARTMENT

CUSTOMER: ☒

PLEASE COMPLETE THIS PORTION, SIGN AND RETURN TOP COPY OF THIS FORM TO CADORATH/UNIFLYTE

VENDOR: ☐

DATE: **12/12/11** P/O: **PO 15462**

CUSTOMER INSTRUCTIONS: ☐

ATTENTION: Chantal Lavoie

VENDOR CORRECTIVE ACTION: ☐

As per my email to you, we will return this part for your evaluation.

AUTHORIZED SIGNATURE

NAME AND TITLE

DATE: 10/13/10

FORM: OPS 097

REVISION: 3